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ORIBATID MITES AND ORGANIC CARBON CONTENT OF SOIL

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The importance of organic matter in relation to the population dynamics of micro-arthropods was suggested by STRENZKE (1952), KARPPINEN (1955) and DAVIS & MURPHY (1961). According to KEVAN (1965), species of cryptostigmata feed on organic matter. According to LOOTS & RYKE (1967), Oribatei in general prefers soils with a high organic content. Seasonal variation has received increasing attention and there has been an encouraging tendency toward long term studies. It appear probable that the effect of macroflora is largely indirect as through litter development and its effect on physical factors and micro-organisms.

Experimental

Two sites I & II each 5 m×5 m were selected near Golapbag University Campus, Burdwan. The vegetation of site I is higher than site II.

Sampling was made by a steel borer. The sample size was 10 cm^2 in surface area and 0 to 15 cm in depth. Oribatids were extracted by Tullgren funnel as modified by MACFADYEN (1961). Altogether 96 soil samples were collected from two sites at weekly interval over a period of 12 months (from January to December, 1969). pH was determined by glass electrode pH meter and organic carbon by rapid titration method of WALKLEY & BLACK (1934). Mechanical analysis of soils was determined by hydrometer method (PIPER, 1942).

Results and Discussion

Soils of site I are alluvial & clay loam and soils of site II are laterite & sandy loam. pH of soils is 6.9 in site I and 6.5 in site II. Organic carbon content and the number of Oribatei are as mentioned in Table 1 and Table 2.

Table 1. Mean values of organic carbon % and oribatid population from four samples in each month.

Site I.

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Organic carbon %	0.92	0.91	0.85	0.82	0.75	0.85	1.10	1.11	1.01	0.98	0.95	0.94
Species												
Scheloribates thermophilus	92	95	88	30	5	90	125	112	99	97	85	89
Scheloribates bengalensis	64	62	50	21	9	29	86	78	69	61	59	60
Lamellobates sp.	52	54	41	16	5	20	69	65	57	49	51	48
Oppia yodai	41	40	38	11	2	18	58	51	49	42	39	40
Archegozetes magna	5	4	8	2	—	—	65	62	58	5	—	—
Allonothrus monodactylus	—	—	—	—	—	1	12	—	—	2	4	3
Total	254	255	225	80	21	158	415	368	332	256	238	240

Table 2. Mean values of organic carbon % and oribatid population from four samples in each month.

Site II.

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Organic carbon %	0.35	0.34	0.31	0.29	0.25	0.30	0.52	0.48	0.45	0.39	0.36	0.37
Species												
Scheloribates thermophilus	22	18	16	15	12	19	59	45	42	38	30	29
Scheloribates bengalensis	25	26	21	15	4	20	38	35	30	28	26	23
Lamellobates sp.	18	17	15	10	2	16	30	28	25	20	19	17
Oppia yodai	11	9	8	6	—	10	18	16	11	9	10	9
Archegozetes magna	—	—	—	—	—	2	25	22	19	5	—	—
Allonothrus monodactylus	—	1	—	—	—	—	9	1	—	—	3	4
Total	76	71	60	46	18	67	179	147	127	100	88	82

Table 3. Mechanical analysis and total count of microorganisms.

Location		Site I	Site II
Mechanical analysis	Sand %	32	62
	Silt %	28	18
	Clay %	41	20
Total count: Dilution of soil: 10^{-5}	Bacteria	45	12
	Fungus	18	6
	Actinomycetes	9	4

Mechanical analysis of soil and total count of bacteria, fungi and actinomycetes as mentioned in Table 3.

In site I organic carbon content of the soil is higher than in site II and the number of oribatids is also higher. The soils of both the sites are slightly acidic. A simple correlation by least square method has been work out and the regression equation fitted by using the data in Table 1 and Table 2. Further, to ascertain the significance of the correlation, co-efficient of correlation has been found out. It is noteworthy that significant correlation (r) has been found to exist between the variables in the first case (0.74), but disappointing in the second case (0.34) where an insignificant correlation has been recorded. The regression equations as found for the data in Table 1 and Table 2 are given below.

$$y_c = -226.83 + 501.77x \text{ (for Table 1)}$$
$$y_c = -180.3 + 726.2x \text{ (for Table 2)}$$

According to LOOTS & RYKE (1966), the accumulation of organic matter in the soil as a result of the growth of plants and the inhabitation of soil animals is an important process. DAVIS & MURPHY (1961) attributed that pH and organic matter were highly important while mechanical composition was less effective in relation to the population density of micro-arthropod. According to SCHUSTER (1956), oribatids have been shown to feed on plant debris, fungi, bacteria and often upon animal debris. "In litter and humus some of the most abundant species of mites belong to the Sarcoptiformes or Cryptostigmata" KEVAN (1965). RODRIGUEZ (1964) has suggested that Cryptostigmata prefer soil of organic nature.

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